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Young Maternal Age and Depressive Symptoms: Results from the 1988 National Maternal and Infant Health Survey

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Introduction

Depression may be more common among adolescent mothers than among older mothers. Child rearing during adolescence interrupts normal cognitive and developmental processes and is often accompanied by socioeconomic disadvantage, single motherhood, and lack of social support, factors related to depression among adult mothers.¹⁻⁸ The interrupted education and diminished career opportunities associated with adolescent childbearing may also lead to long-term financial instability and increased life stresses.^{9,10}

Small surveys have found rates of depressive symptoms to range from 53% to 67% among adolescent mothers and to be associated with age, unmarried status, lower education, and diminished social support.^{5,11} The aim of the present study was to provide population-based estimates of the prevalence of depressive symptoms among primiparous US adolescent mothers; associations between young maternal age, sociodemographic characteristics, and depression were explored in a large, nationally representative sample.

Methods

Data were obtained from the National Center for Health Statistics' 1988 National Maternal and Infant Health Survey. In the live-birth component of this nationally representative survey, stratified systematic samples of 1988 live births were drawn from vital statistics records via a multistage cluster design.¹²⁻¹⁴ Mothers were surveyed at a mean of 17 (SD = 5.0) months postpartum. Details on the sampling scheme, con-

tact protocols, and response rates have been documented elsewhere.¹³

This analysis included primiparous Black or White adolescent respondents and, as a comparison group, all primiparous women 25 to 34 years of age. We excluded mothers of other races (n = 63), infants who were not alive (n = 147) or not living with their mother (n = 197) at the time of the interview, and subjects who did not respond to at least 16 of 20 survey questions regarding depressive symptoms or who gave the same answer to all 20 questions (n = 50). The final sample included 447 women 15 to 17 years old, 479 women 18 to 19 years old, and 870 adult women 25 to 34 years old. Because of the complex sampling scheme used in the National Maternal and Infant Health Survey, all results relied on sample weights that adjusted for the probability of selection and made the data consistent with national counts of 1988 birth events. Thus, our sample of 1796 aimed to represent 760 314 first live births.

Because births to school-aged teens may have a different impact than those to older teens, maternal age was categorized as young teen (15 to 17 years), older teen (18 to 19 years), and adult (25 to 34 years).

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ABSTRACT

Objectives. The goal of this study was to provide population-based estimates of the prevalence of depressive symptoms among primiparous US adolescent mothers.

Methods. Data from the live-birth component of the 1988 National Maternal and Infant Health Survey were analyzed.

Results. The prevalence of depressive symptoms varied by age and race, from 14% among White adult mothers to 48% among Black mothers 15 to 17 years old. After control for income and marital status, the increased prevalence of depressive symptoms associated with adolescent motherhood was greatly diminished (for 15- to 17-year-old Black women and 18- to 19-year-old White women) or eliminated (for 18- to 19-year-old Black women and 15- to 17-year-old White women).

Conclusions. Adolescent mothers experience high rates of depressive symptoms relative to adult mothers, and mental health and other interventions that alleviate the exacerbating influence of poverty and unmarried status are warranted. (*Am J Public Health.* 1998;88:266-270).

Maternal depression at the time of the interview was measured with the Center for Epidemiologic Studies Depression Scale (CES-D).¹⁵ The CES-D is a well-validated 20-item questionnaire that assesses the duration and frequency of depressive symptoms based on respondents' self-reported feelings during the preceding week.¹⁶⁻¹⁸ The CES-D does not measure clinical depression, but a score 16 or higher (of a possible 60) has been used to indicate the presence of substantial depressive symptoms. To be consistent with prior research, we used this cutoff in our analyses.

Variables examined as potential confounders of the association between maternal age and depressive symptoms included maternal education, marital status, and current smoking; family income; type of insurance for infants' health care; current receipt of Aid to Families with Dependent Children or food stamps; enrollment in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) since delivery; and pregnancy intendedness. Both mistimed and unwanted pregnancies were considered "unintended."

Because preliminary analyses indicated variation in rates of depressive symptoms by race, analyses were stratified by this variable. Chi-square tests were used in analyzing dif-

ferences in depressive symptom prevalence among categories of demographic variables. Unconditional logistic regression calculated odds ratios (ORs) for the prevalence of depressive symptoms associated with each category of young maternal age. Variables were considered potential confounders if their addition to a regression model containing only exposure and outcome variables altered the odds ratio by 10% or more.¹⁹ These variables were individually entered into a multivariate model, and the same inclusion criteria were applied to formulate the final model. To account for the complex sampling scheme and the use of weighted data, we obtained variance estimates using SUDAAN software.²⁰

Results

Adolescent first-time mothers of both races were much more likely to be poor, unmarried, and lacking a high school education than adults (Table 1). Teenagers were 3 to 10 times more likely than older mothers to have current Medicaid coverage for their infant, and they were substantially more likely to be receiving public assistance through Aid to Families with Dependent Children, food stamps, or WIC. Young

teen mothers were 3 to 4 times more likely to report that the index pregnancy was unintended than were their adult counterparts.

Adolescent mothers of both races were more likely than older mothers to be depressed: 48% of 15- to 17-year-old Black mothers and 28% of the corresponding White adolescents were depressed, as were 37% of Black 18- to 19-year-olds and 33% of Whites. The corresponding figures for Black and White 25- to 34-year-olds were 25% and 14%. Poverty, unmarried status, and receipt of assistance through Medicaid, Aid to Families with Dependent Children, food stamps, or WIC were significantly associated with depressive symptoms among adult mothers but not among young teens (Table 2).

Unadjusted odds ratios indicated an inverse association between maternal age and depressive symptoms: 15- to 17-year-old adolescents were more than twice as likely as adult mothers to be depressed (Table 3). After family income and marital status had been controlled, the increased prevalence of depressive symptoms associated with adolescent motherhood moderated in both races but remained marginally significant among Black mothers 15 to 17 years of age (OR = 1.6) and White mothers 18 to 19 years of age (OR = 1.6).

TABLE 1—Sociodemographic and Birth Characteristics of Adolescent and Adult Mothers, by Age and Race

	Blacks, Weighted %			Whites, Weighted %		
	15 to 17 years (n = 326)	18 to 19 years (n = 279)	25 to 34 years (n = 260)	15 to 17 years (n = 121)	18 to 19 years (n = 200)	25 to 34 years (n = 610)
Family income						
<100% poverty level	69.0	69.3	25.1	55.0	41.7	5.1
101%–185% poverty level	15.2	16.7	16.8	18.7	24.2	4.7
>185% poverty level	15.8	13.9	58.1	26.3	34.1	90.3
Education, y						
<12	69.6	24.1	6.0	71.2	28.1	3.3
12	27.4	61.1	28.9	21.7	57.8	31.3
>12	3.0	14.8	65.1	7.1	14.1	65.4
Married	3.9	13.9	55.1	33.0	62.0	91.0
Current smoker	12.9	13.3	23.5	40.2	43.2	18.9
Insurance ^b						
Medicaid	65.6	61.5	20.5	38.7	30.4	2.7
Insurance/HMO	19.5	26.0	66.6	34.9	42.8	90.1
Self-pay	15.0	12.5	12.9	26.4	26.8	7.1
Aid to Families with Dependent Children ^c	52.6	53.5	15.1	24.9	15.8	1.8
Food stamps ^c	47.9	45.4	16.3	29.7	19.8	2.9
WIC ^d	83.5	83.8	46.8	72.4	57.0	7.3
Unintended pregnancy	86.8	70.3	37.2	71.4	68.3	17.8
Low-birthweight birth	11.3	10.1	10.4	5.7	6.0	6.2

^aIn relation to 1988 federally defined poverty levels for income and family size.

^bSource of payment for pediatric health care.

^cAt time of survey.

^dAt any time since delivery.

TABLE 2—Prevalence of Depressive Symptoms among Adolescent and Adult Mothers, by Age, Race, and Sociodemographic Variables

	Blacks, Weighted %			Whites, Weighted %		
	15 to 17 years (n = 326)	18 to 19 years (n = 279)	25 to 34 years (n = 260)	15 to 17 years (n = 121)	18 to 19 years (n = 200)	25 to 34 years (n = 610)
Family Income^a						
<100% poverty level	50.2	37.2	47.1 ^b	25.8	52.3 ^b	32.7 ^b
101%–185% poverty level	51.5	41.7	25.0	36.0	10.1	19.2
>185% poverty level	35.4	29.0	16.3	25.9	25.2	12.5
Education, y						
<12	49.9	46.4	53.6 ^b	30.8	45.0	24.9
12	45.3	32.1	36.0	26.9	29.7	17.0
>12	31.1	40.7	18.0	0	21.6	11.7
Marital status						
Unmarried	48.1	37.4	38.4 ^b	29.2	40.9	38.7 ^b
Married	48.1	33.1	14.7	24.8	27.9	11.4
Current smoking status						
Smoker	42.6	30.9	22.7	34.4	46.6 ^b	16.0
Nonsmoker	48.9	37.7	26.2	23.3	22.4	13.3
Insurance^c						
Medicaid	49.8	38.0	43.9 ^b	28.2	58.9 ^b	19.8 ^b
Insurance/HMO	46.0	32.8	19.9	27.8	22.0	12.7
Self-pay	39.9	38.4	24.8	26.8	21.7	25.5
Aid to Families with Dependent Children^d						
Yes	48.2	39.3	59.3 ^b	38.8	56.7 ^b	48.6 ^b
No	47.9	33.9	19.3	24.1	28.4	13.2
Food stamps^d						
Yes	45.5	39.1	56.7 ^b	36.4	51.9 ^b	43.6 ^b
No	50.4	34.9	19.2	24.1	28.2	12.9
WIC^e						
Yes	49.6	37.0	38.4 ^b	30.2	41.2 ^b	30.6 ^b
No	39.3	37.5	13.9	22.6	20.5	12.5
Unintended pregnancy						
Yes	49.1	43.5 ^b	36.9 ^b	31.4	35.1	24.7 ^b
No	41.1	20.8	18.5	18.5	28.1	11.5

^aIn relation to 1988 federally defined poverty levels for income and family size.

^bPrevalence of depressive symptoms significantly different among categories of this variable in this age/race stratum.

^cSource of payment for pediatric health care.

^dAt time of survey.

^eAt any time since delivery.

Discussion

Using data from a large, nationally representative survey, we found high rates of depressive symptoms among adolescent first-time mothers more than a year after delivery. These rates, ranging from 37% to 48% among Black teenagers and from 28% to 33% among Whites, were substantially higher than rates among adult women. Prior US studies have found rates of depressive symptomatology (CES-D score of 16 or higher) to vary widely, from 9% among adults to 67% among adolescent mothers.^{21–24} In a nationally representative sample of adults, 21% of women more than 24 years of age were found to have depressive symptoms.²⁵ The two available studies using the CES-D to estimate depression rates among adolescent mothers involved either

convenience samples of high-risk women or very small samples.^{5,11} Consequently, it is not surprising that the rates found in these studies (53% to 67%) are somewhat higher than those we found. We believe that our results more accurately represent the general scope of depressive symptoms among US adolescent mothers.

Our findings may have been affected by our sample restriction to primiparous mothers. Consistent with previous research documenting a positive association between maternal depression and parity,^{26,27} preliminary analyses of multiparous adolescents in this survey indicated that they were more likely to be depressed than their primiparous counterparts. Because the purpose of our study was to investigate the difference in likelihood of depressive symptoms that may be associated with deferral of child-

bearing into adulthood, we chose to exclude women with prior births.

Use of the CES-D and our scoring categorization affected our results. The CES-D was developed to study the epidemiology of depressive symptoms in the general population and to identify individuals at high risk of depression.¹⁶ It has been shown to be a reliable and valid instrument across racial and gender categories, assessing the number, types, and duration of depressive symptoms.^{16–18} The internal consistency reliability of the CES-D to measure symptoms of depression among adolescents also has been documented, with Cronbach's alpha coefficients similar to those reported for adults.^{28,29} However, the CES-D remains a screening tool, and false positives on the order of 15% to 20% have resulted from use of a cutoff of 16, leading some

TABLE 3—Risk of Maternal Depression, by Age and Race

Age, y	Depressed, %	Crude OR (95% CI)	Adjusted OR (95% CI) ^a
Black women			
15–17	48.1	2.7 (1.9, 3.9)	1.6 (1.0, 2.4)
18–19	36.8	1.7 (1.2, 2.5)	1.0 (0.6, 1.6)
25–34	25.3	1.0 (Reference)	1.0 (Reference)
White women			
15–17	27.8	2.4 (1.4, 4.1)	0.9 (0.5, 1.9)
18–19	32.9	3.0 (2.0, 4.7)	1.6 (1.0, 2.8)
25–34	13.8	1.0 (Reference)	1.0 (Reference)

Note. Analyses were based on the weighted sample. OR = odds ratio; CI = confidence interval.

^aAdjusted for income ($\geq 100\%$ poverty level vs $< 100\%$) and marital status.

researchers to suggest using a higher cutoff point.^{24,30,31} We used 16 as the cutoff for depression to allow comparisons with the majority of past research. Consequently, although a high proportion of mothers in our sample were positive for depressive symptomatology, rates of clinical depression may be substantially lower. However, women with depressive symptoms may be at increased risk of becoming clinically depressed within the next year.^{32,33} Identification of this group may be an important step toward primary prevention of depression in adolescent mothers.

The potential for noncomparability of CES-D results between adolescents and adults has been raised.²⁸ Young adolescents have reported more transient symptoms of depression than adults, although differences in reports of persistent depressive symptomatology have not been found.^{28,29} Concern about age-related differences in the manifestation of depressive disorders has focused primarily on adolescents of junior high school age, and there is evidence that older teens and adults experience similar manifestations of depression.²⁸ Nonetheless, it is possible that the high rates of depression among the youngest adolescents in our study reflect more reporting of transient symptoms of depression. However, the assumption that transient symptoms of depression are of minimal clinical significance may not be appropriate, and adolescent mothers who experience depressive symptoms also may be at greater risk for depression during adulthood.

We were unable to explore the temporal sequence of the association between maternal depressive symptoms and childbearing using data from this cross-sectional survey. Thus, it is possible that preexisting depressive symptoms among respondents increased their likelihood of becoming pregnant and carrying to term and are not the

consequence of pregnancy and childbearing, as we have proposed in this analysis.

In general, the presence of depressive symptoms among adolescent mothers in our study was associated with Black race, unmarried status, low educational attainment, and receipt of assistance through Aid to Families with Dependent Children, food stamps, or WIC. These findings corroborate a growing body of research indicating that maternal depression varies by race and sociodemographic characteristics and is related to inadequate social support and dependence on public assistance.^{2,4,5,11,34} The high rates of depressive symptoms that we found to be associated with age among adolescent mothers of both races may be primarily social in origin, since they moderated considerably with adjustment for adverse socioeconomic circumstances and unmarried status.

Further exploration of the long-term implications of depressive symptoms among adolescent mothers is warranted. Maternal depression has been associated with poor mother–infant interaction, delayed infant development, increased emotional and behavioral problems, and delayed verbal development among toddlers.^{34–37} However, no studies have specifically explored the associations between maternal depressive symptoms and poor social and behavioral outcomes among children of adolescent mothers. The impact of depression may be particularly acute among adolescent mothers, since negative consequences resulting from impaired social functioning may persist years after symptoms subside.³⁸

Our findings, from a large, nationally representative survey, indicate high rates of depressive symptoms among primiparous adolescent mothers, a large proportion of whom are receiving public assistance through Medicaid, Aid to Families with

Dependent Children, WIC, or food stamps. This study suggests that adolescent mothers, who account for more than half a million births annually in the United States,³⁹ may be in need of mental health and social support services. Their frequent connection with public assistance programs provides a potential arena for the initiation of mental health assessment and referrals. □

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Differences in Fertility Associated with Caffeinated Beverage Consumption

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Introduction

An effect of caffeine on human fertility was first reported in a prospective study by Wilcox et al.,¹ who reported a 50% reduction in the per cycle probability of conceiving with intakes equivalent to 1 cup of coffee per day. This was followed by 7 additional reports using retrospectively collected data and an additional prospective study. Five of the retrospective studies²⁻⁶ reported a decrease in fertility due to caffeine, 1 in smokers only⁴ and 1 in non-smokers only.⁶ Two of the retrospective studies^{7,8} and the other prospective study⁹ found no relationship. The potential for reporting biases in retrospective studies and the inconsistency in reported findings prompted us to conduct this study.

Methods

Two hundred ten volunteer members of the Kaiser Permanente Medical Program

who were trying to conceive were followed for 12 months or until the month after they became aware they were pregnant, whichever came first. Only those women who had been trying to conceive for 3 months or less were eligible to participate. If a woman had been trying to conceive for 1, 2, or 3 months prior to entering the study, her first cycle of entry into the study was not categorized as cycle 1; rather, it was respectively categorized as cycle 2, 3, or 4. Based on that schema, not all 210 women started in cycle 1. Women could start anywhere from cycle 1 to cycle 4, depending on how many months prior to entry they were trying to conceive. The number of women at risk in

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ABSTRACT

Objectives. The effect of caffeine consumption on fertility was examined prospectively in 210 women.

Methods. Women reported on caffeinated beverage consumption and pregnancy status monthly. Odds ratios for becoming pregnant were calculated for both high and moderate vs low consumption.

Results. No significant association was found for any of the caffeinated beverages except tea. Drinking one-half cup or more of tea daily approximately doubled the odds of conception per cycle.

Conclusions. These data suggest that caffeine may not be the responsible agent for variation in fertility associated with consumption of the beverages examined. (*Am J Public Health*. 1998;88:270-274)